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10/038,946	01/03/2002	Jerald S. Burkett	BUJ 005 P2	2174

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EXAMINER	
BINDA, GREGORY JOHN	
ART UNIT	**PAPER NUMBER**
3679	3

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.	Applicant(s)
10/038,946	Burkett
Examiner	**Art Unit**
Greg Binda	3679

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *three* MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136 (a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) ☐ Responsive to communication(s) filed on _____.

2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.

3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

Disposition of Claims

4) ☒ Claim(s) *1-16* is/are pending in the application.

4a) Of the above, claim(s) _____ is/are withdrawn from consideration.

5) ☐ Claim(s) _____ is/are allowed.

6) ☒ Claim(s) *1-16* is/are rejected.

7) ☐ Claim(s) _____ is/are objected to.

8) ☐ Claims _____ are subject to restriction and/or election requirement.

Application Papers

9) ☒ The specification is objected to by the Examiner.

10) ☒ The drawing(s) filed on *Jan 3, 2002* is/are a) ☒ accepted or b) ☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13) ☐ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a) ☐ All b) ☐ Some* c) ☐ None of:

1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

*See the attached detailed Office action for a list of the certified copies not received.

14) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).

a) ☐ The translation of the foreign language provisional application has been received.

15) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s). *2*
4) ☐ Interview Summary (PTO-413) Paper No(s). _____
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other:

Drawings

1. The drawings are objected to because:

a. Fig. 2 appears to be labeled as "Fig. 3"

b. Fig. 5 includes reference numeral 46 which is not mentioned in the description.

c. On page 7, line 5, inner tube member 12 is disclosed as being made from metal, but the in Fig. 5 the cross hatching pattern used for inner tube member 12 is for a material other than metal. See MPEP 608.02 for the appropriate cross hatching pattern.

d. The drawings fail to show:

i. A distinct layer corresponding to the "adhesion layer" described on page 8, line 15.

ii. All of the fibers "oriented at a single angle" as recited in claims 3 & 14. Fig. 4A shows the fibers 50 oriented at least two different angles because some of the fibers oriented at angle α and the rest are oriented at angle $-\alpha$. (See Fig. 2a of US 3,850,722 for an example of how having all fibers at the same angle should look.)

iii. The "geodesic isotensoid elliptical shape" recited in claims 8 & 13.

2. A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Specification

3. The disclosure is objected to because page 7, line 11 and page 15, line 9 include an undefined acronym, "CNC".

4. The specification is objected to as failing to comply with 37 CFR 1.71 and 1.75(d)(1) because the detailed description fails to provide proper antecedent basis for the following claimed subject matter:

a. Claim 7, line 2: "elongated fibers which are oriented relative to the curvature of the portion of the end piece"

b. Claim 9: "a mandrel"

c. Claim 13: "an elongated" inner tube member

Claim Rejections - 35 U.S.C. § 112

5. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

6. Claims 3, 6, 8 & 13-16 are rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to enable one skilled

in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

a. Claim 3, lines 5 & 6 and claim 14, lines 4 & 5, recite the limitation, "an ultimate torque strength which exceeds a predetermined maximum operating torque". However the "ultimate torque strength" and "maximum operating torque" are disclosed as the same entity in the specification (see "T_m" on page 11, lines 3 & 13). Therefore it is not possible for one to differ from (i.e. exceed) the other.

b. Claims 6 & 16, lines 3 & 4 recite the limitation, "an indirect connection between the end pieces [14, 16] to the inner tube [12]. However, no such "indirect connection is disclosed. To the contrary, the specification describes on page 7, lines 13-16 and page 8, lines 12-14, a direct connection between the end pieces 14, 16 to the inner tube 12.

c. Claim 6, lines 3 & 4 recites the limitation, "an indirect connection between . . . the inner tube [12] to the composite material [18]." However, no such "indirect connection" is disclosed. To the contrary, the specification describes on page 7, lines 16-18 and page 8, lines 14-17, a direct connection between the inner tube 12 to the composite material 18.

d. Claim 8, lines 2 & 3 and claim 13, lines 7-9, recite the limitation, "the composite material defines a geodesic isotensoid elliptical shape derived with reference to the angle of the fibers". However, "a series of [well known] differential equations" are required to make the structure corresponding to this limitation per page 14, line 10. There is no further description of the required equations nor is there any evidence to support the assumption that said equations are

"well known". Therefore undue experimentation would be required of one skilled in the art to make and/or use the claimed invention due to the numerous parameters involved.

7. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

8. Claims 3, 8 & 12-16 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

✓ a. Claim 3, lines 2 & 3 and claim 14, lines 1 & 2, recite the limitation, "all of the fibers are oriented at a single angle" but its not clear how this can be given that two different angles, angle α & angle $-\alpha$, are shown in the drawings.

b. Claim 8, line 2 recites the limitation, "the composite material defines a geodesic isotensoid elliptical shape". Its not clear how the composite material 18 would constitute such a shape give that the drawings merely show composite material 18 as a cover over the inner tube member 12 and the end pieces 14 & 16. That is, the composite material appears to simply assume the shape of the elements it covers.

c. Claim 8, line 2 and claim 13, line 8, recite the limitation, "a geodesic isotensoid elliptical shape". Its not clear what a "geodesic isotensoid elliptical shape" looks like given that no such shape is shown.

d. The term "thin" in claim 12 is a relative term which renders the claim indefinite. The term "thin" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention.

e. Claim 13, lines 6-8 recites the limitation, "defines a geodesic isotensoid elliptical shape" but it is not clear which of the previously recited elements is defining said shape.

Claim Rejections - 35 U.S.C. § 102

9. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless -
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

10. Claims 1, 4-7 & 9-12 are rejected under 35 U.S.C. 102(b) as being anticipated by Williams, US 3,553,978 (Williams '978). Fig. 1 shows a shaft 10 for the transmission of torsional loads, the shaft 10 comprising: an elongated inner tube member 22; an end piece 12 at an end of the inner tube member 22; a composite material 24 covering the inner tube member 22 and a convexly curved portion (see cylindrical portion 16) of the end piece 12; and a sacrificial layer 25 covering the composite material 24. Torque is transmitted **directly** from the inner tube member 12 via "its end portions" (see col. 2, lines 20 & 21) to the end piece 12 via recess 20. Torque is

transmitted **indirectly** (i.e. through composite material 22) from the inner tube member 22 via its "outer surfaces" (see col. 2, line 22) to the end piece 12 via its outer surface 18. The composite material 24 is disclosed as including elongated fibers (see "longitudinally extending . . . woven glass fibers" in col. 2, lines 48 & 49) which transfer shear loads longitudinally. The "helically woven glass fibers" disclosed in col. 2, line 49 are oriented at approximately 90 degrees relative to the elongated inner tube member 22.

11. Claims 1, 4-7 & 9-12 are rejected under 35 U.S.C. 102(b) as being clearly anticipated by Williams, US 3,592,884 (Williams '884).

12. Claims 1, 2, 4-7 & 9-12 are rejected under 35 U.S.C. 102(b) as being anticipated by Kreft, US 3,850,722. Fig. 2a shows a shaft for the transmission of torsional loads (see also abstract lines 1 & 2), the shaft comprising: an elongated inner tube member 5; at least one end piece 3; a composite material (see "a synthetic fiber . . . wound over" in col. 4, lines 14-16) covering the inner tube member 5 and a convexly curved portion (see Fig. 1 and "dished outer contour" in col. 4, line 18) of the end piece 3. Torque is transmitted **directly** from the inner tube member 5 to the end piece 3 via the clamping ring 2. Torque is transmitted **indirectly** (i.e. through composite material) from the inner tube member 5 to the end piece 3 (see col. 4, lines 28-32). Fig. 3 shows and additional sacrificial layer 6b of fibers oriented 90 degrees relative to the inner tube 5. The

angle of twist at failure of the inner tube member 5 and the composite material are the same because they both comprise the same materials of construction.

13. Claims 1, 4, 9 & 10 are rejected under 35 U.S.C. 102(b) as being anticipated by Underwood, US 3,366,522. Fig. 4 shows a shaft comprising: an elongated inner tube member 4 (see Fig. 1 and "building mandrel" at col. 1, line 62 and col. 4, line 71); at least one end piece 38; and a composite material (see "layers of polyurethane" in col. 3,, line 66) covering the inner tube member 4 and a convexly curved portion 41 of the end piece 38.

14. Claims 1, 4 & 9-11 are rejected under 35 U.S.C. 102(b) as being anticipated by Palmer, US 4,681,556.

Claim Rejections - 35 U.S.C. § 103

15. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

16. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kreft in view of *SAE Universal Joint and Driveshaft Design Manual*. Fig. 2a shows that the elongated fibers 6 are oriented along a single angle α.

a. Kreft does not expressly disclose that the angle of the fibers satisfies the conditions that the shaft have a first natural frequency greater than a predetermined maximum rotational operating speed. However, *SAE* teaches that it is well known in the art to make a shaft so that its critical speed (i.e the speed corresponding the first natural frequency (see page 267, first paragraph)) is greater than the maximum rotational operating speed (see text titled "Safe Operating Speed" on page 270). Therefore it would have been obvious to one of ordinary skill in the art to make the shaft of Kreft so that the angle of the fibers satisfies the conditions that the shaft have a first natural frequency greater than a predetermined maximum rotational operating speed since such a feature is a well known design requirement in the art of shaft making as taught by *SAE*.

b. Kreft does not expressly disclose that the shaft have an ultimate torque strength which exceeds a predetermined maximum operating torque. However, *SAE* teaches that it is well known in the art to make a shaft so that its ultimate torque strength (see "shock torque" in the second paragraph on page 177) exceeds the predetermined maximum operating torque (see "steadily applied torque"). Therefore it would have been obvious to one of ordinary skill in the art to make the shaft of Kreft so that the ultimate torque strength exceeds the maximum operating torque since such feature is a well known design requirement in the art of shaft making as taught by *SAE*.

17. Claims 8, 13, 15 & 16 as best understood are rejected under 35 U.S.C. 103(a) as being unpatentable over Williams '978 in view of Hannibal et al, US 4,569,667 (Hannibal). Williams shows all the limitation the limitations of the claims but does not expressly disclose the fibers defining a geodesic path. In col. 3, line 40 through col. 4, line 11, Hannibal teaches winding the fibers in a geodesic path in order to provide maximum torque transmission capability. Therefore it would have been obvious to one of ordinary skill in the art to make the shaft of Williams with the fibers wound in a geodesic path in order to provide maximum torque transmission capability as taught by Hannibal.

18. Claims 8, 13, 15 & 16 as best understood are rejected under 35 U.S.C. 103(a) as being unpatentable over any one of Williams '884 and Kreft in view of Hannibal for the same reasons noted in item 17 above.

19. Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kreft in view of Hannibal as applied to claim 13 above, and further in view of *SAE* for the same reasons noted in item 16 above.

Conclusion

20. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Ramberg shows end pieces 15 & 16 with curved portions covered by composite

material 12. Yates et al, Gupta, and Corr et al each show a shaft. Jones discloses geodesic winding patterns in col. 5, line 40+.

21. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Greg Binda whose telephone number is (703) 305-2869. The examiner can normally be reached Monday through Thursday from 9:30 am to 7:00 pm. The examiner can also be reached on alternate Fridays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Lynne Browne, can be reached on (703) 308-1159. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9326 (before final), (703) 872-9327 (after final) and (703) 872-9325 (customer service).

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-2168.

GREGORY J. BINDA
PRIMARY EXAMINER